UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
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ART UNIT	PAPER NUMBER
2122	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____ .

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-53* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-53* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

   If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____ .

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

   a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)   4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)   5) ☐ Notice of Informal Patent Application (PTO-152)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2-7* .   6) ☐ Other: .

DETAILED ACTION

Claim Objections

1.   Claims 22 and 52 are objected to because of the following informalities: Claims 22 and

52 are duplicates of Claims 21 and 51 respectively. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making
> and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it
> pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode
> contemplated by the inventor of carrying out his invention.

3.   Claims 8, 13, and 42 are rejected under 35 U.S.C. 112, first paragraph, as containing

subject matter which was not described in the specification in such a way as to enable one skilled

in the art to which it pertains, or with which it is most nearly connected, to make and/or use the

invention. The Microsoft Press Computer Dictionary: Third Edition defines the term 'comment'

as "*text enabled in a program for documentation purposes...Most programming languages have*

syntax for creating comments so that they can be recognized and ignored by the compiler or

assembler. " Hence, it would be impossible to include an inline directive as part of a comment

statement, since this would prevent the directive from ever being run.

4.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the
> subject matter which the applicant regards as his invention.

5.   Claims 15, 16, and 18 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention. In regard to Claims 15 and 16, the term "atypical

characteristic" is unclear. How exactly is "atypical" defined in this context? This term is

interpreted to mean that the characteristic falls beyond a predetermined threshold. In regard to

Claim 18, the term "typical characteristic" is unclear. How exactly is "typical" defined in this

context? This term is interpreted to mean that the characteristic falls within a predetermined

threshold.

Claim Rejections - 35 USC § 102

6.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7.   Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Donovan et al. (U.S.

Patent Number 6,072,951).

In regard to Claim 1, Donovan teaches: (a) identifying a subprogram of a computer

program (Column 1, lines 59-65); (b) selectively inlining computer code of certain execution

paths of the subprogram (Column 2, lines 56-61). Claims 10 and 35 correspond directly with

Claim 1 and are rejected for the same reasons as Claim 1.

In regard to Claim 2, Donovan teaches that each subprogram is a procedure with a predefined activity (Column 1, lines 59-65). This activity can be interpreted as an execution characteristic of the subprogram. Claim 36 corresponds directly with Claim 2 and is rejected for the same reasons as Claim 2.

In regard to Claim 3, Donovan teaches selectively inlining based on execution characteristics of the of the execution paths (Column 3, lines 1-6). Claim 37 corresponds directly with Claim 3 and is rejected for the same reasons as Claim 3.

In regard to Claim 4, Donovan teaches that a characteristic of a path in a subprogram can be the number of statements in the path (Column 9, lines 52-58). The examiner takes official notice that execution time is often estimated based on the number of statements in the program being executed. Claim 38 corresponds directly with Claim 4 and is rejected for the same reasons as Claim 4.

In regard to Claim 5, Donovan teaches frequency of execution as an execution characteristic (Column 2, lines 66-67 and Column 3, line 1). Claim 39 corresponds directly with Claim 5 and is rejected for the same reasons as Claim 5.

In regard to Claim 9, Donovan teaches inline determination based on profile information (Column 2, lines 66-67 and Column 3, lines 1-4). Claim 43 corresponds directly with Claim 9 and is rejected for the same reasons as Claim 9.

In regard to Claim 14, Donovan teaches: (a) identifying a subprogram with first and second execution characteristic. Donovan teaches gathering execution frequencies for a multiple number of paths in a procedure (Column 6, lines 25-30). Each frequency for a given path can be seen as an execution characteristic, and hence the subprogram can have two characteristics; (b)

replacing a portion of the subprogram that exhibits the first execution characteristic with

program instructions that explicitly define the operations of the first execution characteristic

(Column 3, lines 4-6); (c) leaving intact a second portion of the subprogram that exhibits the

second execution characteristic. This is inherent from Donovan, since code that doesn't have a

certain execution frequency is not inlined, and hence is left intact. Claim 44 corresponds directly

with Claim 14 and is rejected for the same reasons as Claim 14.

In regard to Claim 15, Donovan teaches that the number of statements of a path of the

subprogram can also be used as an execution characteristic for a number of portions of the

subprogram (Column 9, lines 52-58). Donovan teaches that if this characteristic exceeds a

threshold (the code has too many statements), then the code is not inlined, and hence the portion

of code is left intact. Thus the characteristic that leaves a portion of the subprogram intact is

atypical. Claim 45 corresponds directly with Claim 15 and is rejected for the same reasons as

Claim 15.

In regard to Claim 16, Donovan teaches that a characteristic of a path in a subprogram

can be the number of statements in the path (Column 9, lines 52-58). The examiner takes official

notice that execution time is often estimated based on the number of statements in the program

being executed. Claim 46 corresponds directly with Claim 16 and is rejected for the same

reasons as Claim 16.

In regard to Claim 17, Donovan teaches that the characteristic exceeds a predetermined

threshold (Column 9, lines 52-58). Claim 47 corresponds directly with Claim 17 and is rejected

for the same reasons as Claim 17.

In regard to Claim 18, Donovan teaches that if the first execution characteristic is within a threshold (the code has less statements than the threshold), then the code is inlined, and hence the portion of the subprogram is replaced. Thus the characteristic that replaces the portion of the subprogram intact is typical. Claim 48 corresponds directly with Claim 18 and is rejected for the same reasons as Claim 18.

In regard to Claim 19, Donovan teaches that a characteristic of a path in a subprogram can be the number of statements in the path (Column 9, lines 52-58). The examiner takes official notice that execution time is often estimated based on the number of statements in the program being executed. Claim 49 corresponds directly with Claim 19 and is rejected for the same reasons as Claim 19.

In regard to Claim 20, Donovan teaches that a characteristic of a path in a subprogram can be the number of statements in the path (Column 9, lines 52-58). Hence the first and second characteristics are based on the number of statements (arguments) operated on by the subprogram. Claim 50 corresponds directly with Claim 20 and is rejected for the same reasons as Claim 20.

In regard to Claim 23, Donovan teaches: (a) identifying a subprogram (Column 1, lines 59-65) that has a plurality of execution characteristics. Donovan teaches gathering execution frequencies for a multiple number of paths in a procedure (Column 6, lines 25-30). Each frequency for a given path can be seen as an execution characteristic; (b) inlining only a selected portion of the subprogram that corresponds to the execution characteristics. Donovan teaches that the portions of the subprogram that are executed most frequently are those that are inlined (Column 3, lines 4-6).

In regard to Claim 24, Donovan teaches that the selected portions are defined by selected paths of a plurality of execution paths (Column 2, lines 56-61).

In regard to Claim 28, Donovan teaches identifying a subprogram that operates in a first manner when operands passed to the subprogram fall within a first range of values and in a second manner when operands passed to the subprogram fall within a second range of values. Donovan teaches that execution frequencies are gathered for each path in the subprogram (Column 2, lines 66-67 and Column 3, line 1). Donovan teaches that when the execution frequency of a certain path exceeds a threshold, the program is inlined. Frequency counters are often placed into the code in order to gather frequency information. Donovan teaches that a subprogram exceeds a threshold (when the subprogram operates in a first manner) when a frequency counter (operand passed to the subprogram) falls within a first set of values. (Column 6, lines 30-34). When the frequency counter exceeds a threshold, Donovan teaches replacing subprogram statements with expanded code (Column 3, lines 1-6). Claim 53 corresponds directly with Claim 28 and is rejected for the same reasons as Claim 28.

In regard to Claim 29, Donovan teaches: (a) determining the execution path of the subprogram to executed when a reference to the subprogram is encountered. Donovan teaches that a subprogram can be a procedure that performs an action (Column 1, lines 59-66). A reference to the subprogram can be interpreted as a call to the subprogram, and Donovan teaches identifying paths in the subprogram (Column 2, lines 56-61); (b) replacing the reference to the subprogram with a portion of the subprogram corresponding to the execution path of the subprogram (Column 2, lines 21-25). Claim 33 corresponds directly with Claim 29 and is rejected for the same reasons as Claim 29.

In regard to Claim 30, the examiner takes official notice that changing input parameters in a computer program can alter the execution path of the computer program, such as with conditional statements, which can take many different paths depending on input parameters. Claim 34 corresponds directly with Claim 30 and is rejected for the same reasons as Claim 30.

In regard to Claim 32, the examiner takes official notice that converting source code to object code is an inherent aspect of compiling mentioned in Claim 29.

Claim Rejections - 35 USC § 103

8.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9.   Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Donovan et al. (U.S. Patent Number 6,072,951) in view of Wang (U.S. Patent Number 5,940,616).

In regard to Claim 6, Donovan teaches the method of Claim 1, but does not teach selectively inlining based on an inline indication associated with the execution path. Wang, however, does teach such an indication (Figure 8B, lines 59, 64, and 70). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use a method of inlining code of a computer program by identifying a subprogram and inlining certain paths of the subprogram as taught by Donovan, where inlining is based on an inline indication in the code as taught by Wang, since this allows the compiler to easily recognize which paths of the code

should be inlined. Claims 11 and 40 correspond directly with Claim 6 and are rejected for the same reasons as Claim 6.

In regard to Claim 7, Wang teaches that the inline indication is a directive (Column 5, lines 23-28). Claims 12 and 41 correspond directly with Claim 7 and are rejected for the same reasons as Claim 7.

In regard to Claim 25, Donovan teaches the method of Claim 24 but does not teach determining the selected path by identifying a directive associated with the path. Wang, however, does teach such a directive (Column 5, lines 23-28).

In regard to Claim 26, Wang teaches that the inline directive exists in the code, and hence is included in the selected path (Figure 8B, lines 59, 64, and 70).

In regard to Claim 31, Wang teaches an inline command which signals an optimization process by identifying a reference to a subprogram and replacing the reference with part of the subprogram code (Column 5, lines 23-28).

10.   Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Donovan et al. (U.S. Patent Number 6,072,951) in view of Lanning (U.S. Patent Number 5,787,285).

In regard to Claim 21, Donovan teaches the method of Claim 20 but does not teach that the first and second execution characteristics are invoked based on conditional computer statements associated with these characteristics. Lanning, however, teaches that a profiler collects for each multi-way branch instruction, the number of times each case has been taken (Column 6, lines 14-26). In other words, characteristics of a certain branch are invoked based on a conditional computer statement. Claim 51 corresponds directly with Claim 21 and is rejected for the same

reasons as Claim 21. Claims 22 and 52 are duplicates of Claims 21 and 51, respectively, and are

rejected for the same reasons as Claims 21 and 51.

In regard to Claims 27, Donovan teaches the method of Claim 23 but does not teach

that the execution characteristics are identified by evaluating a conditional program statement

associated with the subprogram call. Lanning, however, teaches that a profiler collects for each

multi-way branch instruction, the number of times each case has been taken (Column 6, lines 14-

26). In other words, characteristics of different branches are identified based on a conditional

computer statement.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Kenneth A Gross whose telephone number is (703) 305-0542.

The examiner can normally be reached on Mon-Fri 7:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Gregory A Morse can be reached on (703) 308-4789. The fax phone numbers for the

organization where this application or proceeding is assigned are (703) 746-7239 for regular

communications and (703) 746-7240 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is (703) 305-3900.

KAG
March 26, 2003

GREGORY MORSE
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